

# Fuelling the economy

Cara Williams

One of the hottest commodities today is a barrel of oil. While the price has fluctuated dramatically over the last several years, it has remained substantially higher than the December 2001 price of \$15.95.<sup>1</sup> The reasons for the increase are multi-faceted. First, world demand is increasing, particularly in newly developed countries such as China and India. Indeed, demand rose more in 2004 than in any other year since 1976, mainly because of China, which is now the second biggest user of oil after the United States. On the supply side, geopolitical conflicts have destabilized oil supplies, leading to increased prices. Also, much of the oil is now more difficult to extract—wells are deeper, drilling occurs offshore, special technology is needed for the oil sands. This translates to higher production costs and higher prices for consumers (see *The downside*). Canada is currently the eighth-largest producer of crude oil at about 2.5 million barrels per day. Current world demand is approximately 84 million barrels per day (CAPP n.d. a), while production stands at about 86 million barrels (Government of Alberta, DOE n.d. a).

With the second largest proven oil reserves in the world (after Saudi Arabia), Canada is well positioned as one of the few countries outside OPEC with significant prospects for production growth (National Energy Board 2005). Indeed, increased demand coupled with price hikes have led to consistent growth in the energy sector. In particular, the oil sands, which hold an estimated 175 billion barrels of oil, have seen further development (CAPP n.d. b).

Natural gas is also important, both for export and domestic consumption. Currently, Canada is the second largest exporter of natural gas after Russia (Government of Alberta n.d.). As oil prices have increased, so too have natural gas prices (although not for all the

same reasons). In general, the oil and gas industry in Canada is likely to continue to grow in terms of capital investment, revenue, jobs and wages.

## The downside

Any economic boom has positive and negative implications. On the positive side, increased economic activity usually translates into increased capital investment, as well as employment and wage growth. However, negative implications also arise—particularly if economic growth occurs rapidly. For example, infrastructure may not be able to keep up with growth in the affected region, leading to housing shortages and overcrowding in schools and hospitals. Because of the housing shortage in Fort McMurray, Alberta, hundreds of temporary housing units have had to be established for workers drawn to the region. Additionally, a boom such as the current one in Alberta can result in labour shortages in all industries, driving up wages and subsequently prices across the board. However, wage increases in Alberta have not been able to attract the needed labour, and many businesses have had to reduce their hours as a result of staffing shortages (Bennett 2006).

The oil and gas sector also has significant environmental impact on water, air and land. Environment Canada estimated that the energy sector as a whole (production and processing of oil, natural gas and coal; petroleum refining; and transportation by pipeline) accounted for about 20% of Canada's total greenhouse gas emissions in 2004 (Environment Canada et al. 2006). While all oil and gas sectors are working towards decreasing their energy use and developing or adopting pollution abatement technologies, it is clear that as production increases it will become increasingly more important to find and develop methods of reducing emissions.

The oil and gas industry also uses a significant amount of water. It is used for conventional drilling, for oil sands surface mining, and for *in situ* oil sands production where the sands are too deep to mine. Water is also used in oil sands upgraders, and in refineries and petrochemical companies (for more specific usages, see [www.waterforlife.gov.ab.ca](http://www.waterforlife.gov.ab.ca)). The upstream component of oil and gas accounts for about 7% of total water allocation in Alberta (about 37% of groundwater and about 6% of surface water). In response to concern over water usage, oil sands producers are now recycling up to 90% of the water they use (Centre for Energy n.d. b).

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Three component sectors define oil and gas: upstream, midstream, and downstream (see *Component industries in oil and gas*). The article first looks at economic activity in each component sector and then analyzes employment (see *Data sources and definitions*). Only effects directly related to the oil and gas industry are examined. The substantial spin-off effects into other industries such as construction and services are not included.

## Economic activity

### Upstream

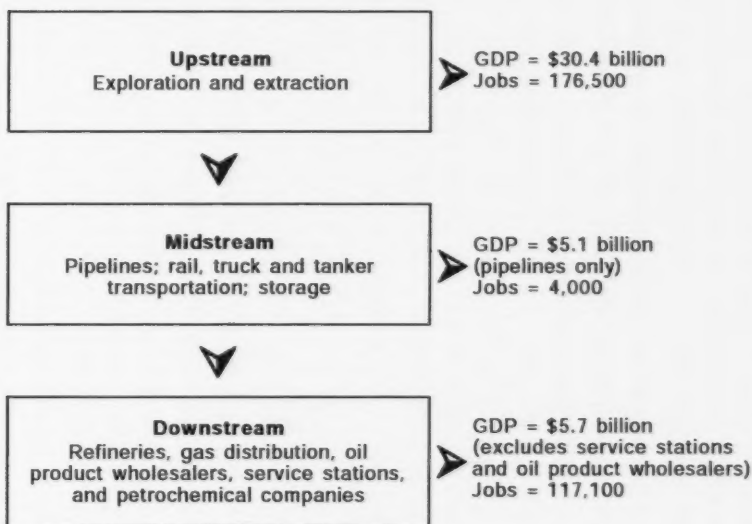
As the price of oil and gas increases, so too does exploration and extraction of both conventional and non-conventional sources (see *The basics of oil and gas*). In 2004, the number of oil and gas wells drilled stood at 24,874, up from 18,480 in 2000. Production from Canada's enormous supply of non-conventional energy has also grown rapidly. Indeed, 42% of all domestic oil output in 2004 came from oil sands, and most of the increase in natural gas production since 2004 has come from coal-based methane (Cross 2006).

**Table 1 Production of crude oil**

	Total	Conventional		Non-conventional	
	Cubic metres ('000)		%	Cubic metres ('000)	%
1997	112,670	82,066	73	30,604	27
1998	117,082	82,847	71	34,235	29
1999	111,028	78,090	70	32,938	30
2000	116,360	80,971	70	35,389	30
2001	118,165	79,822	68	38,343	32
2002	126,877	83,901	66	42,976	34
2003	134,748	84,690	63	50,058	37
2004	139,286	81,769	59	57,517	41
2005	136,177	78,918	58	57,258	42

Source: Statistics Canada, Manufacturing, Construction and Energy Division

## Component industries in oil and gas

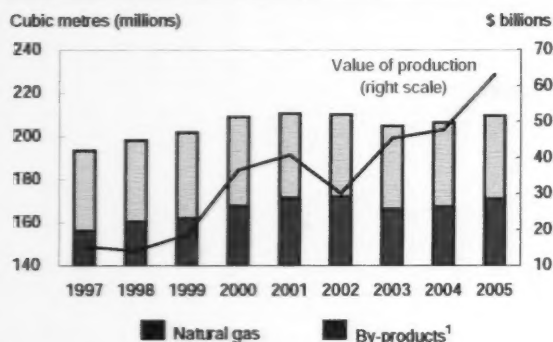


Sources: Statistics Canada, Income and Expenditure Accounts; Labour Force Survey, 2006

In terms of volume, crude oil production increased by 21% between 1997 and 2005. Over the same period, the value of production increased by 184% (Table 1). Total crude production in 2005 was 136,177,000 cubic metres with a value at \$45.2 billion, up from 112,670,000 cubic metres and a value of \$15.9 billion in 1997. Natural gas production (including by-products) increased by about 8% between 1997 and 2005 (from 193,320,000 to 209,534,000 cubic metres), but because of higher prices, the value of production increased by more than 312% (Chart A).

Since Canada's production of oil and natural gas surpasses domestic needs, much of it is sold on the world market. Not surprisingly then, crude oil and natural gas exports play an important role in international trade. In 2006 they

**Chart A While natural gas production volume increased 8%, its value quadrupled**



¹ Includes pentane plus, propane, butane and ethane.

Source: Statistics Canada, Manufacturing, Construction and Energy Division

totalled \$64.9 billion, up from \$20 billion in 1997, with virtually all exports headed to the United States (Rowat 2006). Nevertheless, in central Canada, oil is imported for refining and consumption or re-export (950 Mb/d in 2004) (National Energy Board n.d.).

The extraction of oil and gas is complex and capital-intensive, particularly for non-conventional sources. When oil and gas prices are high, exploration and extraction of these reserves increase. Recent record prices have meant that capital expenditures for oil and gas extraction have grown substantially, far exceeding those in other industries. In 2005, capital investment in the oil and gas extraction industry (both conventional and non-conventional) was about \$45.3 billion, more than double the \$18.9 billion in 1997 (Chart B).

Because much of Canada's oil reserves are in non-conventional sources (for example, oil sands), much of the increase in capital expenditures went to this area. Indeed, capital expenditures for non-conventional crude oil increased a staggering 450% between 1997 and 2005, from \$1.9 to \$10.4 billion, illustrating the growing importance of this source. Given this enormous clout in the economy, it is not surprising that the upstream oil and gas sector contributed more than \$30 billion (1997 dollars) to GDP in 2006, up from \$25 billion in 1997, and is by far the largest of the three component sectors.

## Data sources and definitions

This paper draws on several Statistics Canada sources.

Data for crude oil and natural gas production and capital investment in the oil and gas extraction industry are from the Manufacturing, Construction and Energy Division.

Pipeline data originate from the **Survey of Monthly Oil Transport** and **Monthly Oil Pipeline Statement**, which cover the activities of all pipelines in Canada receiving and delivering crude oils, liquefied petroleum gases (propane, butane and ethane), and refined petroleum products.

Information on the number of gas stations and sales is from the **Retail Store Survey** and **Retail Chain Survey**.

All employment figures (including average hourly earnings) are from the **Labour Force Survey** and based on the North American Industry Classification System (NAICS).

### Upstream employment

Oil and gas extraction: NAICS 2111

Support activities for mining and oil and gas extraction: NAICS 2131

### Midstream employment

Pipeline employment, which includes pipeline transportation of crude oil: NAICS 4861; pipeline transportation of natural gas: NAICS 4862; and other pipeline transportation: NAICS 4869.

Because it is impossible to separate out employment related to the oil and gas industry for rail, truck and tanker transportation or for storage of oil and gas products, these have not been included. Thus the figures may somewhat underestimate total midstream employment.

### Downstream employment

Petroleum and coal products manufacturing (includes refineries and petroleum and coal products manufacturing): NAICS 3241

Natural gas distribution (utilities): NAICS 2212

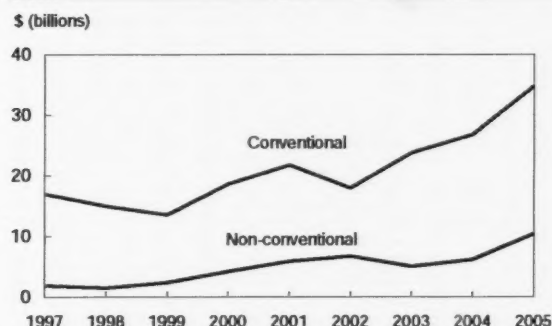
Petroleum product wholesaler distributors: NAICS 4121

Gasoline stations: NAICS 4471

### Midstream

The midstream sector comprises pipelines; rail, truck and tanker transportation; and storage. Pipelines alone contributed about \$5 billion to GDP in 2006<sup>3</sup> with approximately 95% of Canada's crude oil and natural gas transported by this method (Centre for Energy n.d. a). Given the size of the country, it is not surprising that Canada has the longest pipeline network in the world for crude oil. Originally constructed in 1950 to run from Edmonton to Superior, Wisconsin, the Enbridge system (originally called the Interprovincial Pipeline) has been expanded over the years, and now

**Chart B Capital investment in extraction has increased sharply in recent years**



Source: Statistics Canada, Manufacturing, Construction and Energy Division

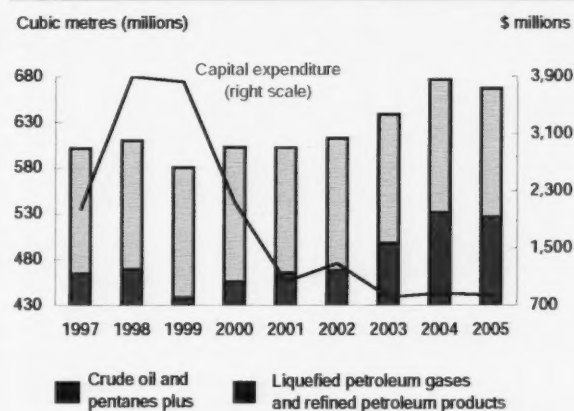
runs from Norman Wells in the Northwest Territories, through Alberta, south to Oklahoma, and east to refineries in Chicago and central Canada. Today 700,000 km of different-sized oil and gas pipelines criss-cross Canada (Government of Alberta, DOE n.d. b). The Canadian-operated ones transported 667 million cubic metres of crude oil and other petroleum products across the country in 2005, up from 602 in 1997, with capital expenditures in 2005 of about \$835 million (Chart C).

While pipeline movements of oil and gas are extensive, rail is another important distribution channel, with many shipments originating in Alberta and eastern Canada destined for customers in Canada, the U.S. and overseas. Of all petroleum products and hydrocarbon gases transported in 2004, 16.4 million tonnes were at some point carried by rail. Although Statistics Canada does not produce figures on freight revenues by type of commodity shipped, the 2005 annual report from CN rail noted that 16% (or \$1,096 million) of total freight revenue was associated with petroleum and chemical shipments, illustrating the economic importance of the midstream sector.

#### Downstream

The downstream component is made up of refining and marketing, which includes refineries, gas distribution utilities, oil product wholesalers, service stations, and petrochemical companies. The GDP contribution

**Chart C After major expenditures in the late 1990s, Canadian-owned pipelines have recently been spending much less**



Sources: Statistics Canada, Monthly Oil Pipeline Transport; Monthly Oil Pipeline Statement

of the downstream sector (not including the wholesale or retail petroleum industries) was about \$5.7 billion in 2006 (1997 dollars).

Refineries process crude oil by sorting, splitting, reassembling and blending hydrocarbons. In 2006, 19 refineries were operating in Canada with a total refining capacity of about 330,000 cubic metres (about two million barrels) per day. Of the 19 refineries, 2 produced either asphalt or petrochemicals, while the others produced a range of petroleum products. Refinery utilization has been high over the last five years and is expected to remain at about 90% capacity (National Energy Board n.d.). Refineries in western Canada process only Canadian crude oil, while those in the rest of the country process both imported and domestic.

Petroleum product wholesalers (establishments primarily engaged in wholesaling crude oil, liquefied petroleum gases, heating oil, and other refined petroleum products) have seen pronounced sales growth over the past few years. Estimates of wholesale sales have increased from approximately \$60 billion in 2001 to \$87.5 billion in 2004.



## The basics of oil and gas

### Crude oil

Crude oil is a naturally occurring mixture of hydrocarbon compounds trapped in underground formations. Oil was produced as ancient vegetation and marine life died and settled on the bottom of streams, lakes, seas and oceans. Sediment covered this organic material, and subsequent heat and pressure changed it into oil. The vast majority of Canada's oil comes from the Western Canada Sedimentary Basin (WCSB) and offshore eastern Canada. The WCSB produces 88% of all oil in the country, the majority within Alberta. In eastern Canada, oil is found in and offshore Newfoundland and Labrador and off Nova Scotia.

Conventional crude oil comprises light, medium and heavy hydrocarbons. Light crude flows easily and when refined produces large amounts of transportation fuel such as gasoline, diesel and jet fuel. Heavy crude requires extra pumping or dilution to flow easily, producing primarily heating oil and a smaller amount of transportation fuel. Conventional crude oil is extracted by well drilling. It is called 'sweet' if it contains only small amounts of sulphur and 'sour' if the sulphur content is high. The average recovery rate for oil is about 30%—meaning that more than two-thirds of it stays in the ground and is not recovered because of cost or current technology (CAPP n.d. c).

Non-conventional crude oil differs from conventional in where it is found and how it is extracted. In Canada, the largest non-conventional source is the oil sands of Alberta (formerly called tar sands). The oil here is known as bitumen, and the sand and water in which it is found needs to be removed. Because bitumen is too thick to flow, it must be heated or diluted with lighter hydrocarbons. It takes about two tonnes of oil sand to produce one barrel of oil (Government of Alberta, DOE n.d. c).<sup>2</sup>

Currently, about 3,000 products are derived from crude oil. These include gasoline, ink, crayons, bubble gum, deodorant, dishwashing liquid, tires, ammonia, heart valves, eyeglasses, waxes, plastics, synthetic rubber, and asphalt.

Another feature of the downstream oil and gas sector is the 19,200 gas stations found across the country. In 2004, their sales (gas and other products) totalled almost \$35 billion (Chart D). When consumers pull into a gas station, the upstream and midstream sectors of oil and gas remain in the background.

### Employment

Between 1997 and 2006, employment in Canada increased by about 20%. In the three oil and gas sector components, roughly 298,000 people were employed in 2006, an increase of about 22% over 1997 (Table 2).<sup>4</sup> Compared with other industries, jobs in all three components are much more likely to be held by men. In 2006, only 28% of jobs in the oil and gas industry were held by women, compared with 47% of jobs in

### Natural gas

*This part of the country seems to have all hell for a basement and the only trapdoor appears to be in Medicine Hat.*  
—Rudyard Kipling on a visit to Alberta in 1907

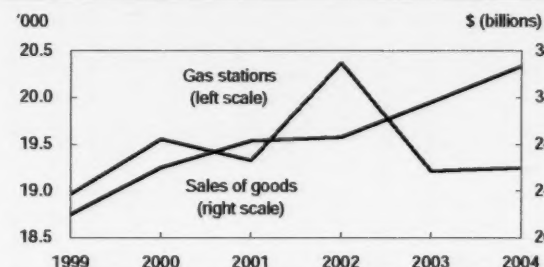
In some parts of Canada, natural gas has been a source of energy since the 1800s, but it wasn't until the late 1950s and the completion of the TransCanada Pipeline that use of natural gas became widespread. Since then, demand has grown steadily, and today Canada is the third largest producer of natural gas in the world. Domestically, natural gas heats almost 50% of homes and is the main source of energy for 51% of the manufacturing sector (Canadian Gas Association n.d.).

Like crude oil, natural gas is a hydrocarbon-compound fossil fuel. Its main component is methane, but it also contains ethane, propane and butane. It is conventionally found in reservoirs several metres or kilometres below the earth's surface. Non-conventional sources include coal-bed methane, tight gas sands, gas shales, and gas hydrates, all of which are more difficult to extract (for more information see the Centre for Energy at [www.centreforenergy.com](http://www.centreforenergy.com)).

Natural gas is largely found in Alberta, but British Columbia and Saskatchewan also have resources. Known resources of recoverable conventional natural gas are estimated to be about 58 trillion cubic feet. Another 500 trillion cubic feet are thought to be available from coal-bed methane. However, it is not known how much of this can be recovered (Energy Information Administration 2007).

Natural gas is an energy source in several areas, providing fuel for furnaces, appliances, vehicles, electricity generation, steam-heat production, and co-generation of heat and electricity.

**Chart D The number of gas stations has plateaued but sales have continued to increase**



Sources: Statistics Canada, Retail Store Survey; Retail Chain Survey

other industries. Other differences include unionization status and hourly earnings. Although employees in oil and gas industries were less likely to be unionized (12% versus 32%), their hourly earnings were about 24% higher. These differences are even more pronounced for the individual components.

**Upstream—full-time, male and well-paid**

Between 1997 and 2006, employment in oil and gas extraction grew by about 43%—from 55,000 to about 79,000.<sup>5</sup> In support industries, the growth over this period was about 88%, reaching 98,000 in 2006 (Table 3). Relative to other industries, employment in oil and gas extraction held constant, ranking 18th in both 1997 and 2006. Not surprisingly, most employment was in Alberta with its vast

**Table 2 Labour force characteristics**

	All industries		Oil and gas related		Non oil and gas	
	1997	2006	1997	2006	1997	2006
Employed	13,706.0	16,484.3	244.7	297.6	13,461.3	16,186.8
Self-employed	2,349.4	2,498.0	28.6	34.9	2,321.4	2,463.1
			'000			
<b>Sex</b>						
Men	54.5	52.9	74.6	71.8	54.1	52.6
Women	45.5	47.1	25.4	28.2	45.9	47.4
<b>Age</b>						
15 to 34	40.1	36.8	48.8	44.8	40.0	36.6
35 to 54	50.1	49.1	45.4	46.0	50.2	49.1
55 and over	9.7	14.1	5.8	9.3	9.8	14.2
<b>Union coverage<sup>1</sup></b>						
Yes	33.7	31.7	13.8	12.3	34.1	32.0
No	66.3	68.3	86.2	87.7	65.9	68.0
<b>Work schedule</b>						
Full-time	80.9	82.0	85.5	88.3	80.8	81.8
Part-time	19.1	18.0	14.4	11.7	19.2	18.2
<b>Average hourly earnings</b>			\$			
	12.92	16.73	14.80	20.64	12.88	16.66

<sup>1</sup> Excludes self-employed

Source: Statistics Canada, Labour Force Survey

**Table 3 Upstream employment**

	Total		Extraction		Support industries	
	1997	2006	1997	2006	1997	2006
Employed	107.1	176.5	55.2	78.7	51.9	97.8
Self-employed	14.6	21.6	3.6	F	11.0	20.2
			'000			
<b>Sex</b>						
Men	81.0	76.7	75.4	67.5	87.1	84.0
Women	19.0	23.3	24.6	32.7	12.9	15.8
<b>Age</b>						
15 to 34	40.1	43.9	34.2	38.2	46.4	48.5
35 to 54	53.7	47.0	60.9	52.1	46.1	42.9
55 and over	6.2	9.1	4.9	9.7	7.5	8.6
<b>Union coverage<sup>1</sup></b>						
Yes	7.9	9.7	7.9	9.2	8.1	10.2
No	92.1	90.3	92.1	90.8	91.9	89.8
<b>Work schedule</b>						
Full-time	94.9	95.8	96.0	97.2	93.6	94.6
Part-time	5.1	4.2	4.0	2.8	6.4	5.3
<b>Average hourly earnings</b>			\$			
	17.24	24.21	20.47	30.36	13.79	19.26

<sup>1</sup> Excludes self-employed

Source: Statistics Canada, Labour Force Survey

oil and gas reserves. Indeed, approximately 75% of jobs in the industry were in this province.

Workers in the oil and gas industry are much more likely to work full time. In 2006, about 97% of those in oil and gas extraction worked full time (95% in support industries) compared with about 82% in other industries. They were also much less likely to be unionized (9% versus 32%).

Their hourly earnings in 2006 were also substantially higher. While the average was \$16.73 for the labour market as a whole, earnings were about 80% higher in oil and gas extraction (\$30.36). The gap has not always been so large. In 1997, employees in oil and gas extraction earned only 58% more per hour than the average worker (\$20.47 versus \$12.92).

It is impossible to determine the exact employment figure for activities supporting oil and gas extraction since the mining industry is also included here. That said, in 2006, employment in the support activities for oil, gas and mining industries was almost 98,000, an increase of 88% since 1997. And while it is not possible to determine what percentage of the increase was a result of the oil and gas boom, it has clearly played an important role in employment growth.

**Midstream—Pipeline workers: above average wages and predominately male**

Because it is not possible to separate petroleum products from the transportation and storage of other commodities, this section deals only with the pipeline industries. In 2006, employment in pipeline industries was about 4,000, about 44% lower than the 1997 figure of just over 7,000 (Table 4). Just as for oil and gas extraction, workers in these industries are primarily male and have substantially higher average hourly earnings (\$34.36 versus \$16.73).

**Downstream—young, low-paid and non-unionized**

While upstream and midstream employment in the oil and gas sector consists of full-time well-paid jobs, downstream employment varies widely. This is not surprising given the wide array of industrial components. Overall, the downstream sector in 2006 employed approximately 117,000 individuals in a variety of industries (Table 5).<sup>6</sup> Because employment is quite different in each one, they are examined individually.

Petroleum and coal products manufacturing includes refineries as well as asphalt paving, shingles, and other petroleum and coal manufacturing. Employment in this indus-

**Table 4 Midstream employment**

	1997	2006
	'000	
Employed	7.1	4.0
Self-employed	F	F
	%	
<b>Sex</b>		
Men	81.7	80.0
Women	F	F
<b>Age</b>		
15 to 34	40.9	F
35 to 54	52.1	65.0
55 and over	F	F
<b>Union coverage<sup>1</sup></b>		
Yes	21.1	F
No	78.9	100.0
<b>Work schedule</b>		
Full-time	100.0	100.0
Part-time	F	F
	\$	
Average hourly earnings	21.83	34.36

<sup>1</sup> Excludes self-employed  
Source: Statistics Canada, Labour Force Survey

try totalled about 16,400 in 2006, down from almost 21,000 in 1997. Much like oil and gas extraction, this field was predominately male, non-unionized, and full-time. Average hourly earnings, at \$28.19, were much higher than the general working population, and higher than any other component in the downstream sector.

Employment in petroleum product wholesaling was virtually the same in 2006 and 1997, about 11,500. This industry was also predominately male (61%), and virtually all worked full time. Not surprisingly, hourly earnings were above average at \$18.85. Employment in this industry was primarily in Alberta, Ontario and Quebec.

Employment in the distribution of natural gas rebounded somewhat in 2006 after declining steadily between 1997 and 2005. In 2005, it employed approximately 14,800 people, down from 20,600 in

1997, but the level rose to 15,300 in 2006. This industry is indicative of most oil and gas industries in that hourly earnings were substantially higher than the average (\$27.12 versus \$16.73), and almost all workers were full-time. Interestingly, it had the highest unionization rates of all oil and gas industries at about 45%.

Gasoline stations illustrate the varied employment in the downstream sector. Employment at gas stations was far higher than in any other industry in the midstream or downstream sectors. Not surprisingly, workers here had the lowest average earnings and were much younger. In 2006, some 74,000 individuals worked at gas stations across the country, down from almost 78,000 in 1997. Nearly 60% were under 35, compared with about 30% in the other downstream industries. Hourly earnings, at \$8.61, were strikingly lower than in any other oil and gas industry, and 50% lower than the overall average. Because employment does not depend on where oil and gas are extracted, jobs are spread throughout the country in line with population distribution—26% in Ontario, 21% in Quebec, 16% in British Columbia, and 13% in Alberta.

**Summary**

With the discovery of oil at Leduc well no. 1 in Alberta in February 1947, Canada was transformed almost instantly from an oil-poor to an oil-rich nation. Recent development of non-conventional sources of oil and gas has further augmented the importance of this industry to the Canadian economy. By 2006, the contribution to GDP of all sectors of the oil and gas industry had exceeded \$40 billion (1997 dollars), and direct employment totalled almost 300,000.

**Table 5 Downstream employment**

	Total		Manufacturing		Wholesale		Natural gas distribution		Gas stations	
	1997	2006	1997	2006	1997	2006	1997	2006	1997	2006
	'000									
Employed	130.5	117.1	20.9	16.4	11.3	11.6	20.6	15.3	77.7	73.9
Self-employed	13.9	13.4	F	F	1.8	F	F	F	11.8	11.9
	%									
<b>Sex</b>										
Men	69.0	64.1	82.3	87.2	70.8	61.2	59.2	71.2	67.6	57.9
Women	31.0	35.9	17.7	12.8	29.2	38.8	40.8	28.1	32.4	42.1
<b>Age</b>										
15 to 34	56.3	46.7	32.1	20.7	37.2	30.2	32.5	26.1	71.9	59.3
35 to 54	38.3	43.6	61.2	72.0	53.1	56.0	59.7	60.8	24.3	31.9
55 and over	5.4	9.6	F	F	F	13.8	7.8	13.1	3.7	8.8
<b>Union coverage<sup>1</sup></b>										
Yes	18.0	15.8	31.4	31.7	F	F	50.5	45.4	5.2	4.8
No	82.0	84.2	68.6	68.3	91.6	87.8	49.5	54.6	94.8	95.2
<b>Work schedule</b>										
Full-time	77.2	76.8	94.7	99.4	94.7	92.2	94.7	95.4	65.3	65.4
Part-time	22.9	23.2	F	F	F	F	F	F	34.7	34.6
	\$									
Average hourly earnings	12.42	14.78	22.03	28.19	14.18	18.85	20.78	27.12	7.38	8.61

<sup>1</sup> Excludes self-employed

Source: Statistics Canada, Labour Force Survey

In the upstream sector, which comprises oil and gas extraction, investment and production have become driving forces in the economy. Indeed, between 1997 and 2005, investment in oil and gas extraction more than doubled from \$18.9 billion to \$45.3 billion, far exceeding any other industry. While production of natural gas levelled off in 2005, production of crude oil increased by 21% over the same period. Employment in this sector reached approximately 177,000 in 2006, and average hourly earnings were about 45% higher than in the labour market in general.

The midstream component of oil and gas is made up of transportation and storage. In Canada, 700,000 kilometres of pipelines carried approximately 700 million cubic metres of petroleum products in 2005 and contributed about \$5.1 billion to GDP. Employment related to pipelines was relatively small in 2006 with only 4,000 people.

The downstream sector of oil and gas includes refineries, petroleum manufacturing and wholesale distribution, utilities, and gas stations and employs about 117,000. Currently the 19 refineries in Canada have

the capacity to process 330,000 cubic metres of petroleum per day. For many consumers, the closest they get to the oil and gas industries is when they pull into one of over 19,000 gas stations in Canada.

Today Canada is recognized as an important player in terms of oil and natural gas. As global supplies dwindle, it becomes profitable to develop resources that are more difficult to extract—such as the oil sands. If geopolitical tensions remain high in other oil-producing areas of the world, Canada's role will become even more important.

### Perspectives

#### ■ Notes

1 This figure represents the per barrel refinery acquisition cost of imported crude oil.

2 A standard barrel of oil contains 159 litres. A barrel of oil when refined yields 72 litres of gasoline. Barrels are referred to as 'bbl' because in the past the only barrels guaranteed to contain 42 US gallons were blue barrels manufactured for Standard Oil. This has become the standard.



3 Unfortunately, it is possible to get GDP numbers only for pipelines. Information on transportation of crude oil products by rail, truck or tanker and on storage of petroleum products is not available.

4 This article looks at direct not indirect employment. For example, construction has increased substantially in Alberta, partly as a result of the boom in the oil and gas industry. This indirect employment is not included.

5 Employment figures are available only for oil and gas extraction as a whole; employment for the natural gas sector and the crude oil sector cannot be separated.

6 Unfortunately, it is not possible to separate out employment for petrochemical companies, so these are not included in employment counts for the downstream sector.

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